Pat Lank

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PERSONAL

- Born on October 7th, 1993
- Citizenship: United States

EDUCATION

- **University of South Carolina** January 2021 to May 2024
  - Phd in Mathematics
  - Advisor: Matthew Ballard
- **University of New Mexico** August 2017 to December 2020
  - M.Sc. in Mathematics
  - Advisor: Alexandru Buium
- **University of Massachusetts in Lowell** August 2015 to August 2017
  - B.Sc. in Mathematics

POSITIONS

Professional.

- **Università degli Studi di Milano** Fall 2024 | Present
  - Postdoctoral research fellow
  - Supervisor: Amnon Neeman
- **Simons-Laufer Mathematical Sciences Institute** April 2024
  - Research associate

Visitor.

- Universität Graz June 2026
  - Host: Nebojsa Pavic
- Institute of Mathematics of the Czech Academy of Sciences in Prague June 2026
  - Host: Michal Hrbek
- UCLA May 2026
  - Host: Sridhar Venkatesh, Joaquín Moraga
- University of Pennsylvania April 2026
  - Host: Andres Fernandez Herrero
- Max Planck Institute for Mathematics February 2026
  - Host: Kabeer Manali-Rahul
- Basque Center for Applied Mathematics September 2025
  - Host: Ilya Smirnov
- Institute of Mathematics of the Czech Academy of Sciences in Prague July 2025
  - Host: Michal Hrbek
- University of Glasgow March 2025
  - Host: Timothy De Deyn
- Univerzita Karlova February 2025
  - Host: Jan Šťovíček
- University of Michigan August 2024

– Host: Mircea Mustaţă

RESEARCH

Publications, preprints, & in preparation.

(30) *Compact approximation implies compactly generated aisles for algebraic stacks*
- joint with Michal Hrbek
- In preparation

(29) *Comparing Grothendieck groups of mixed Hodge modules and coherent sheaves*
- joint with Sridhar Venkatesh
- In preparation

(28) *Numerics and product-compatibility for algebraic stacks*
- joint with Fei Peng
- In preparation

(27) *Semistable proxy smallness for schemes*
- joint with Michal Hrbek, Giovanna Le Gros, and Sergio Pavon
- In preparation

(26) *Dualizing complexes for algebraic stacks*
- arXiv

(25) *Thomason condition for regular algebraic stacks*
- arXiv

(24) *Yoga for Fourier–Mukai partnership*
- joint with Kabeer Manali-Rahul and Nebojsa Pavic
- arXiv

(23) *Frobenius generation for algebraic stacks*
- joint with Fei Peng
- arXiv

(22) *Nonexistence of singly compactly generated t-structures for schemes*
- joint with Anirban Bhaduri, Timothy De Deyn, Michal Hrbek, and Kabeer Manali-Rahul
- arXiv

(21) *Measuring birational derived splinters*
- joint with Timothy De Deyn, Kabeer Manali-Rahul, and Sridhar Venkatesh
- arXiv

(20) *A note on quasi-perfect morphisms*
- joint with Timothy De Deyn and Kabeer Manali-Rahul
- arXiv

(19) *Simple criteria for higher rational singularities*
- joint with Sándor Kovács and Sridhar Venkatesh
- arXiv

(18) *Perfectly generated t-structures for algebraic stacks*
- arXiv

(17) *Compact approximation and descent for algebraic stacks*
- joint with Jack Hall, Fei Peng, Alicia Lamarche
- arXiv

(16) *Regularity and bounded t-structures for algebraic stacks*
- joint with Timothy De Deyn, Kabeer Manali-Rahul, Fei Peng
- arXiv

(15) *Descending strong generation in algebraic geometry*
- joint with Timothy De Deyn, Kabeer Manali-Rahul
- arXiv

(14) *Integral transforms on singularity categories for Noetherian schemes*
- joint with Uttaran Dutta, Kabeer Manali-Rahul
- arXiv | accepted to Michigan Math. J.

(13) *Measuring rationality of Schwede–Takagi pairs*
- joint with Peter McDonald, Sridhar Venkatesh
- arXiv

(12) *Descent and generation for noncommutative coherent algebras over schemes*
- joint with Timothy De Deyn, Kabeer Manali-Rahul
- arXiv

(11) *Approximability and Rouquier dimension for noncommuative algebras over schemes*
- joint with Timothy De Deyn, Kabeer Manali-Rahul
- arXiv

(10) *Triangulated characterizations of singularities*
- joint with Sridhar Venkatesh
- arXiv | Nagoya Math. J.

(9) *Classification and nonexistence for t-structures on derived categories of schemes*
- joint with Alexander Clark, Kabeer Manali-Rahul, Chris J. Parker
- arXiv

(8) *Closedness of the singular locus and generation for derived categories*
- joint with Souvik Dey
- arXiv | J. of Algebra

(7) *Dévissage for generation in derived categories*
- joint with Souvik Dey
- arXiv | Proc. Amer. Math. Soc.

(6) *Approximation by perfect complexes detects Rouquier dimension*
- joint with Noah Olander
- arXiv | Mosc. Math. J.

(5) *Preservation for generation along the structure morphism of coherent algebras over a scheme*
- joint with Anirban Bhaduri, Souvik Dey
- arXiv | Bull. Lond. Math. Soc.

(4) *Descent conditions for generation in derived categories*
- arXiv | J. Pure Appl. Algebra

(3) *Strong generation for module categories*
- joint with Souvik Dey, Ryo Takahashi
- arXiv | J. Pure Appl. Algebra

(2) *High Frobenius pushforwards generate the bounded derived category*
- joint with Matthew Ballard, Srikanth Iyengar, Alapan Mukhopadhyay, Josh Pollitz
- arXiv | Forum Math. Sigma

(1) *Generation and dimension for derived categories*
- PhD thesis, 2024

Expository.

- *Gorensteinness for algebraic stacks*, PDF

- *A short note on Du Bois singularities*, arXiv
- *Chatzistamatiou–Rülling higher vanishing in the non-excellent case*, PDF

INVITED TALKS/LECTURES

(36)	Universität Graz	June 2026
(35)	Univerzita Karlova	June 2026
(34)	Summer school on mirror symmetry, University Zaragoza for RAGS (*lecture*)	June 2026
(33)	UCLA	May 2026
(32)	University of Pennsylvania	April 2026
(31)	AMS special session, Tulane University	March 2026
(30)	Università di Pavia	March 2026
(29)	Max Planck Institute for Mathematics	February 2026
(28)	Basque Center for Applied Mathematics, Spain (*lecture*)	September 2025
(27)	Noncommutative geometry and higher structures, Genova	June 2025
(26)	Università degli Studi di Milano	April 2025
(25)	University of Glasgow	March 2025
(24)	Univerzita Karlova	February 2025
(23)	Universität Hamburg	January 2025
(22)	AGNES, Dartmouth University	November 2024
(21)	Purdue University	October 2024
(20)	AMS special session, Howard University	April 2024
(19)	COMA/NAG, Simons-Laufer Mathematical Sciences Institute	March 2024
(18)	AMS contributed paper session, Joint mathematics meetings	January 2024
(17)	University of Georgia	October 2023
(16)	Syzygies & mirror symmetry, Amer. Inst. of Math. (*lecture*)	September 2023
(15)	New directions in group theory and triangulated categories	May 2023
(14)	Georgia algebraic geometry symposium (GAGS), University of Georgia	May 2023
(13)	Categorical methods in moduli theory, University of Pennsylvania	April 2023
(12)	AMS special session, Spring Central Sectional	April 2023
(11)	AMS special session, Southeast Sectional	March 2023
(10)	University of Utah	September 2022
(9)	Algebraic geometry & singularity theory, University of Washington	June 2022
(8)	Commutative algebra regional expository seminar	April 2022
(7)	University of South Carolina	February 2022
(6)	Commutative algebra regional expository seminar	October 2021
(5)	Algebraic geometry number theory, University of South Carolina	March 2021
(4)	University of New Mexico	November 2019
(3)	University of New Mexico	December 2018
(2)	Women in mathematics in New England, Smith College	September 2016
(1)	MAA northeast spring section meeting, University of New England	June 2016

TEACHING

University of South Carolina.

Instructor of Record. Completely responsible for lectures, office hours, exams, homework assignments, and grades.

- MATH 122 - Business calculus — Spring 2024
- MATH 111i - Intensive Basic College Mathematics — Fall 2023
- MATH 174 - Discrete structures for computer science — Spring 2023
- MATH 111 - Basic college mathematics — Fall 2022
- MATH 241 - Calculus III — Summer 2022
- MATH 122 - Business calculus — Spring 2022
- MATH 111 - Basic college mathematics — Fall 2021 (overload)
- MATH 115 - Precalculus — Fall 2021
- MATH 241 - Calculus III — Summer 2021
- MATH 122 - Business calculus — Spring 2021

University of New Mexico.

Instructor of Record. Completely responsible for lectures, office hours, exams, homework assignments, and grades.

- MATH 180 - Calculus I — Summer 2020
- MATH 103 - Intermediate algebra III — Fall 2018
- MATH 102 - Intermediate algebra II — Fall 2018
- MATH 101 - Intermediate algebra I — Fall 2018
- MATH 121 - College algebra — Fall 2017

Graduate Teaching Assistant. Completely responsible for grading exams and homework assignments.

- MATH 521 - Abstract algebra (graduate course) — Spring 2020
- MATH 319 - Number theory — Spring 2020
- MATH 327 - Discrete structures — Spring 2019
- MATH 322 - Modern algebra — Spring 2019
- MATH 321 - Linear algebra with applications — Fall 2019

GRANTS/AWARDS

- Marie Skllodowska-Curie Seal of Excellence — Spring 2026
- NSF MSPRF (recommended for award; not funded) — Spring 2025
- Outstanding graduate student award in mathematics (UofSC) — Spring 2024
- Teaching award from Student Disability Resource Center (UofSC) — Fall 2023
- AMS Mathematical Research Communities — Summer 2023
- AMS graduate student sectional travel grant — Spring 2023
- AMS-NSF-Simons-ICM travel grant — Spring 2022

SERVICE & LEADERSHIP

Supervision & mentorship.

- Elías Guisado Villalgordo, PhD Student at Basque Center for Applied Mathematics (BCAM)
  - Co-advisor with Ilya Smirnov
  - Expected 2028

Referee & review.

- Bull. Lond. Math. Soc.
- Appl. Categ. Struct.
- Rend. Sem. Mat. Univ. Padova
- zbMATH Open

Committee & outreach.

- Math 111 textbook committee for UofSC — Spring 2024
- Math tutoring Center coordinator — Summer 2023
- Graduate student panel committee — Summer 2021, Spring 2022
- Proctor for UNM PNM state wide mathematics exam — Fall 2017, Spring 2019
- City-wide concert and fundraiser, Nashua NH Soup Kitchen — Fall 2011

Organization.

- `Mini workshop`: Derived categories in algebra, geometry, & topology — June 2025
- Algebraic geometry `seminar` (UniMi) — Spring 2025 to present
- D.A.N.C.E. seminar `(online seminar)` — January 2025 to present
- JMM: `Special session` on derived categories, arithmetic & geometry — January 2024
- `Graduate colloquium` (UofSC) — Fall 2021 to Spring 2023
- Algebraic geometry and commutative algebra `seminar` (UofSC) — Fall 2021 to Spring 2023

MISC.

- Over a decade of retail and food service, few of which include management experience.